

# NETIMIS

## CASE STUDY

### Improving the Patient Flow of Scleroderma Patients at Chapel Allerton Hospital

Client: Diagnostic Evidence Co-operative (DEC) Leeds

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# Overview

Chapel Allerton Hospital is a leader in the investigation of rheumatic and musculoskeletal diseases. The Rheumatology Department acts as a regional hub for the Yorkshire and Humber. The department's main aim is to provide a service for patients who have been diagnosed, or are undergoing a diagnosis, with Scleroderma. Scleroderma is an autoimmune and rheumatic disease that affects the body by hardening the skin and connective tissues.

This case study details how NETIMIS was used as a simulation tool to allow the comparison of the current process of diagnosis for Scleroderma with a future state redesigned process which includes a proposed Point of Care Testing (POCT) device. This POCT device will reduce the number of patients being held in the diagnostic process due to inconclusive results.

## About

Scleroderma is a chronic, autoimmune connective tissues disease which is classified as a rheumatic disease. It is caused by the patient's immune system becoming overactive and attacking the connective tissue beneath the skin and surrounding the internal organs and blood vessels. This causes thick scarring and the

thickening of tissue which can sometimes lead to problems with patient's internal organs. The thickening of the skin is one of the first noticeable symptoms.

There are two main types of Scleroderma:

- Localised Scleroderma
- Systemic Sclerosis

In Localised Scleroderma, the condition mainly affects the skin and is the mildest form of the condition.

In Systemic Sclerosis (SSc) the condition is more severe and internal organs such as the heart, oesophagus, blood vessels, kidneys, lungs, blood pressure and digestive system can be affected as well.

Within SSc there are two types, Limited SSc and Diffuse SSc. In Limited SSc the hands, lower arms, feet, lower legs, and face are mainly affected. Typical symptoms are thickening of the skin over the hands, feet and face, red spots on the skin, and problems with swallowing.

In Diffuse SSc internal organs are more likely to be affected. Changes to skin can be seen all over the body and are not limited to certain areas. Symptoms may come on suddenly and worsen quicker over the first few years but the condition will normally settle. In some cases, both

Limited and Diffuse SSc can affect other organs and can potentially lead to more serious conditions such as Pulmonary Hypertension and Interstitial Lung Disease.

## Challenges

The main problem with the current care process of SSc is the time that patients are spending within the care pathways as well as the total cost this incurs.

During the investigation stage, it was stated that patients can spend up to five years within the pathway before they are either referred or medically managed.

Certain conditions, such as Raynaud's Phenomenon (RP - a common condition that affects the blood supply to certain parts of the body) are early signs of SSc. Patients need to be tested for RP but the results are never 100% accurate, resulting in a retest. This retest takes place every six months for up to five years if the test results are negative which is the time it takes to ensure an accurate diagnosis.

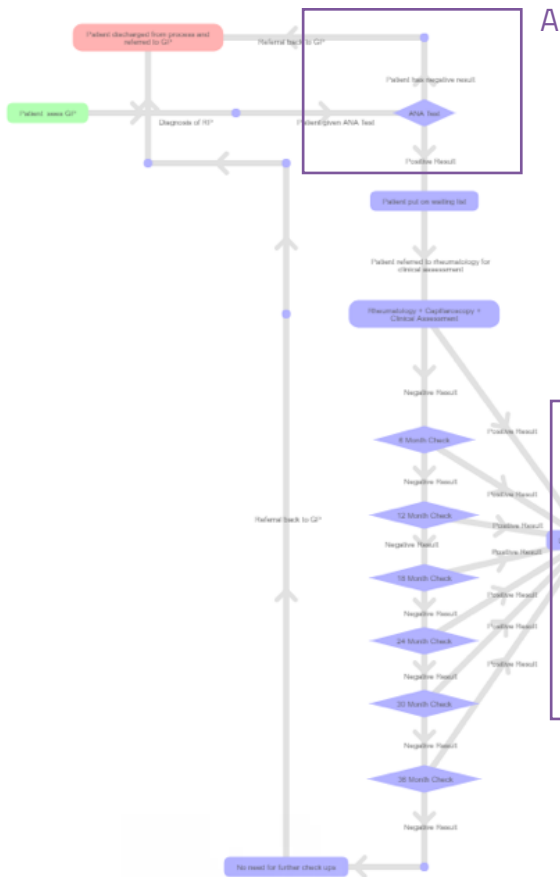
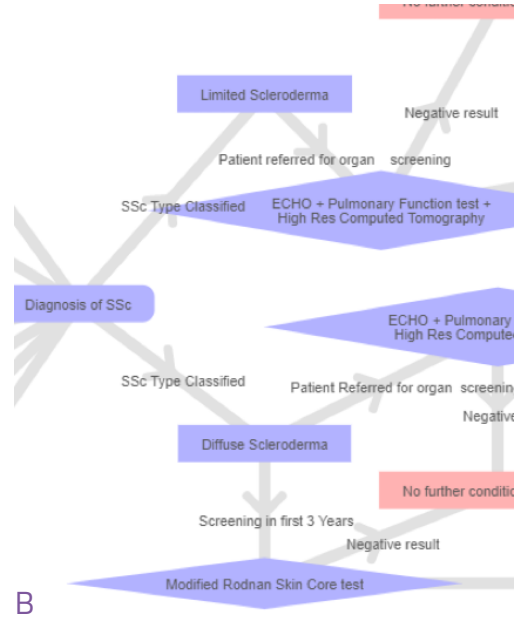
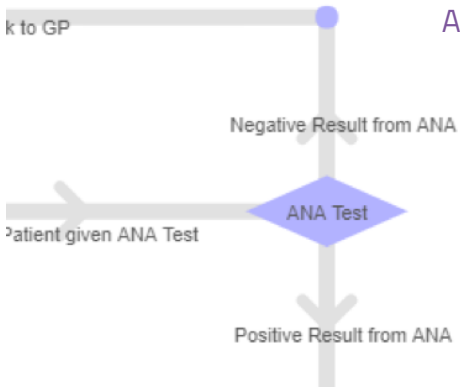
## Solution

To improve the current state process, a POCT device can be implemented within the pathway to increase the accuracy of diagnosis. This ensures patients are correctly referred to their GP or screened for further tests at an earlier stage in the process.

## How NETIMIS helped

NETIMIS provided an easy way to model the patient pathway. It also provided a way to visualise both pathways side by side and view a comparison report, identifying inefficiencies in the current pathway.

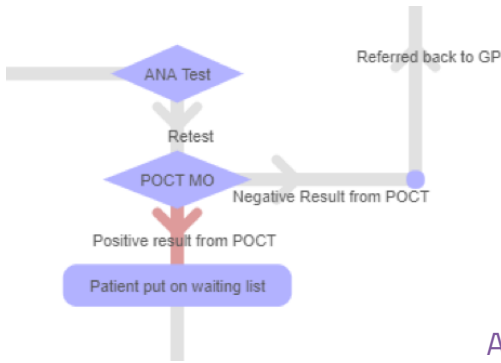
# Current State Pathway



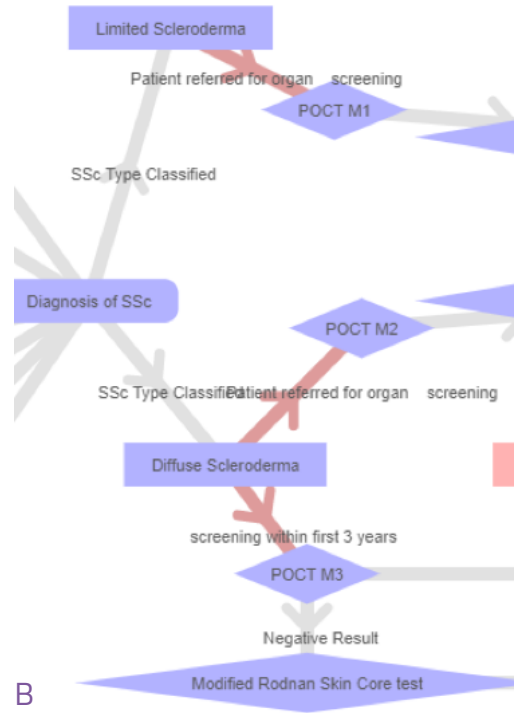
Below is the current state process that takes place within Chapel Allerton Hospital.

In the current state process the patients are classified and referred.

# Future State Pathway



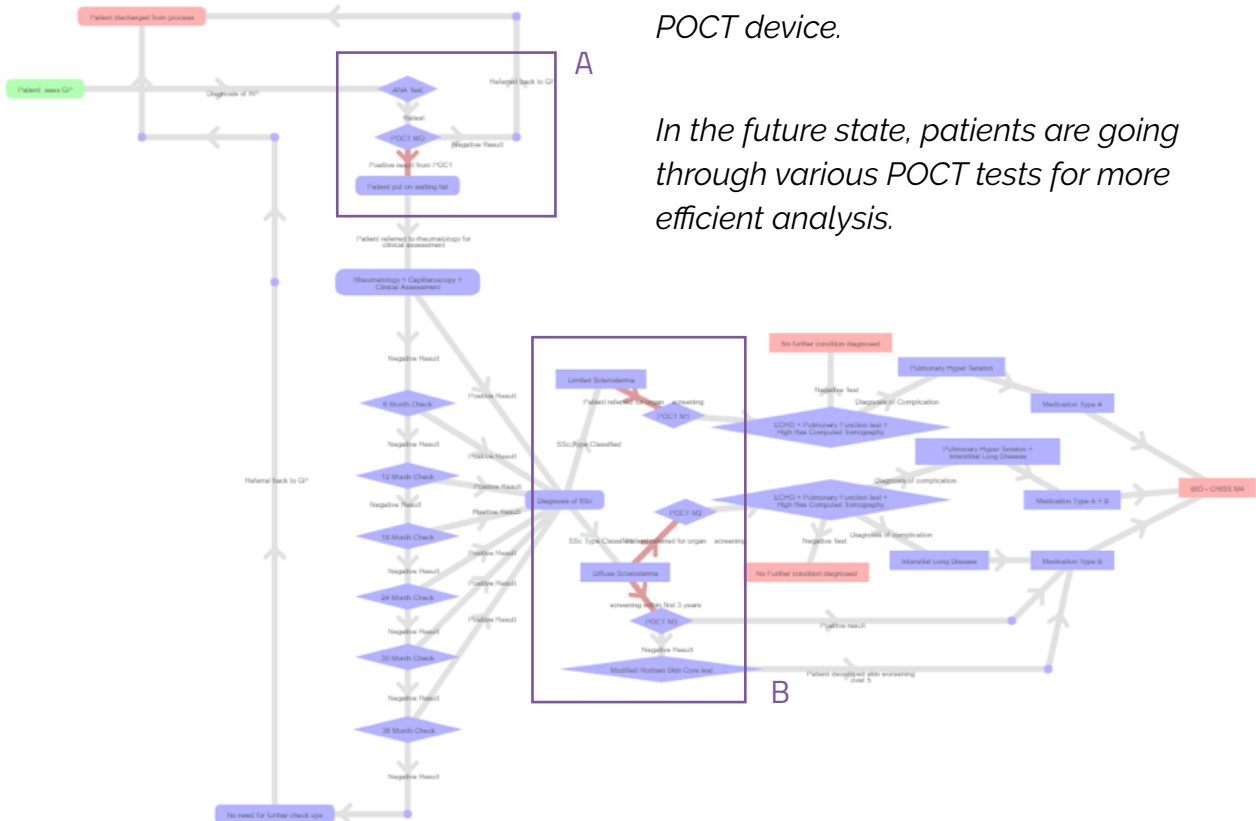
A



B

The proposed redesign of the process is that a retest will be carried out with the POCT device.

In the future state, patients are going through various POCT tests for more efficient analysis.



A

B

The report provides a comparison of the current and future state pathway. The future state pathway includes the implementation of the new POCT device. Both models were simulated using 400 patients as a population.

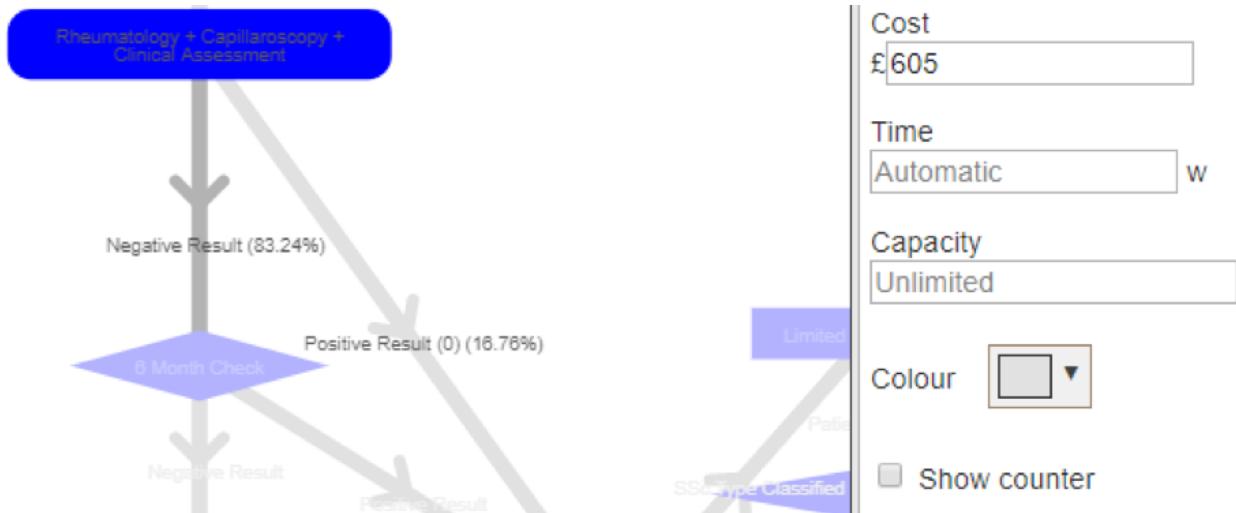
# NETIMIS

## Comparison Report 31/07/2017 11:10:36

	Current Process Full + Waiting List	Redesigned Process Full
Patients	400	400
Paths used	5,611	3,834
Longest time	13w	14w
Total cost	£634,094	£355,586

*From the comparison report produced by NETIMIS, it is clear to see a cost reduction in the process because of the redesign and the implementation of the POCT device.*

The cost calculations are based on the reimbursement costs for a patient's first visit and capillaroscopy (new referrals cost £605, a six month follow up visit costs £80 and an annual capillaroscopy costs £250). Similarly, the cost of echocardiograms, pulmonary function tests and high-resolution computed tomographies (HRCTs) have been included in the model as per Leeds Teaching Hospital Trust's costing template. The assumption is that once the patient has had a 'Rheumatology + Capillaroscopy + Clinical Assessment', there will be a cost involved each time the patient is diagnosed with either a 'Positive' or 'Negative' result. The costs are specified in the Pathway Settings for each pathway within NETIMIS, and an example has been included below:



# Conclusion

NETIMIS proved useful in creating and simulating complex healthcare scenarios. It made the assessment and evaluation of the POCT device and any risks, easy to understand.

From this, the benefits of implementing the POCT device were also realised and they are as follows:

- Cost benefits
- More efficient care leading to:
  - Increased patient satisfaction
  - Reducing patients staying in the process for longer than necessary